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ABSTRACT

A study is presented which investigated ways Spanish speaking preschool children learn to identify letters of the alphabet, the types of errors made in identifying letters, and whether there is a developmental learning sequence in alphabet learning for Spanish speakers. The question of the influence of socioeconomic level on performance was also considered. Sixty-three children from a Spanish language preschool and 64 children from two English language preschools participated in the study. Each child was asked to identify the letter of the alphabet which was printed on a card. Comparison of responses revealed significant differences in the number of correct responses and in the types of errors. Examination of the errors revealed that English speaking children move from making conceptual errors at age 3 to making perceptual discrimination errors between similar letter configurations at age 5. Spanish speaking 5-year olds performed in much the same manner as English speaking 3-year olds. It is suggested that investigation of home environment variables might indicate reasons for the difference in the acquisition of basic cognitive and linguistic skills. (Author/AMH)

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Alphabet Identification by Spanish Speaking Three to Five Year Olds

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Alphabet Identification by Spanish Speaking Three to Five Year Olds

Examination of national statistics comparing English and Spanish speakers earning power, high school completion rate or academic acheivement scores in the elementary grades reveals significantly higher levels of attainment for English speaking, non-Hispanic citizens (Brown, Rosen, Hill, & Olivos, 1980). In a nation of twelve million Americans of Hispanic origin, 5.6% of the total population may not be achieving their full potential, either educationally or economically. As research by Barik and Swain (1976, 1978) suggests that learners who are literate in two or more languages achieve equal or higher scholastic levels, as well as greater cognitive growth than monolingual learners, it is not necessarily bilingualism that keeps Hispanic learners from full educational achievement. Cummins (1979) proposes that the problem may be due to the fact that many bilingual learners may be illiterate or semilingual in both Spanish and English, and thus, unable to effectively use either language. This semilingualism may be due to language and cognitive deficiencies in knowledge areas dealing with literacy, i.e., using language for cognitive processes, communicating ideas through print, etc. (Cummins, 1980).

One of the young learner's earliest encounters with the formal materials of literacy is with the alphabet. It has long been an accepted fact that knowing the alphabet prior to instruction predicts success in beginning reading (Bond and Dykstra, 1967). In addition, however, knowledge of how the alphabet is learned, knowledge of where the child is on the continuum of developing alphabet understanding, and knowledge of types of errors made as alphabet letters are identified,

might be used to gain an understanding of the learner's conceptual knowledge about print. While little or no research on print concepts has been done using Spanish speaking preschool children, examination of work done with English speakers might give insight into how some of these basic understandings are acquired.

Young learners are able to distinguish between print and nonprint, writing and nonwriting, long before they enter school. Development of this ability has been observed by examining childrens' own print production (Hildreth, 1936) and their ability to discriminate between writing and nonwriting (Lavine, 1977). Both research studies indicate that, as the learner matures, the individual letter and its distinctive features become increasingly important in print identification.

Distinctive features of capital letters and the features each shared in common with other letters have been identified by Gibson (1969). Features used in identifying capital letters include curve versus straight lines, roundness, squareness, linearity, perspective, rotation, reversal, and break-close. Some discriminations are more easily learned than others. Thorson (1976), using a Posner-type matching task, found that the more features, as defined by Gibson, two capital letters had in common, the more difficult it was to differentiate between them. Preschool learners have little difficulty with break-close features, but do not appear to master line-curve and rotation-reversal features until at least 6 years of age and perspective transformation features until after 8 years of age (Gibson, 1965).

Dunn-Rankin, Leton, and Shelton (1968) analyzed lower case letters to determine their similarities. Six clearly definable clusters of letters having

high within group confusability were revealed. In a further study (Dunn-Rankin, 1968), letter pairs were examined to determine the largest common area that each letter shared with every other letter. Common area space was defined as that space which two letters share when superimposed and axially rotated. Five letter groupings and critical features for analysis within those groups were established. Features important for lower case identification include short open vs. closed curves, closed curves vs. straight line, open curve vs. straight line, extended curve vs. short straight line, and line slant. Errors in identification due to rotation of the figure in space made by English speaking five (Popp, 1964), seven and eight year olds (Dunn-Rankin, 1968) were found to occur frequently within these feature groups and rarely, or never, between groups.

Using English speaking preschool children, Masonheimer (1981) identified a three step developmental process in alphabet learning. Each step is typified by a different type of error in identification. The earliest step involves the development of the conceptual understanding of the difference between word names, number names, and letter names. Children who are at the first stage of alphabet letter learning, initially call letters by word names. Word naming gradually gives way to number naming. Numbers may be named in order, i.e., 1, 2, 3, 4, etc., until the end of the learner's count string is reached, at which time they start over at the beginning. Idiosyncratic counting lists, i.e., 1, 2, 6, 10, 15, 11, etc., or idiosyncratic number names, i.e., two-six, fiftwenty, forty-forty, etc., are also used. Idiosyncratic number counts may include letter names, i.e., 1, 2, 7, m, 5, b, h, etc. The amount of number and word naming decreases, until by age five, no word naming errors occur and number naming errors

involve only the graphemes i, l, or E and the numbers one and three. Learners at this stage exhibit conceptual confusion between words, numbers, and letters.

Step two errors in alphabet identification indicate a confusion in matching name to grapheme, rather than a confusion in concepts. This is taken as, (1) an indication that the child is beginning to learn the names of the graphemes, but does not, as yet, realize that specific names go with specific figures, or (2) that the child is not attending to relevant features which aid in differentiation between letters within feature groups. Responses of this type include cases in which the child calls all of the letters by one single letter name, responses in which four or five letter names are randomly applied to all graphemes, and responses in which a large number of letter names are randomly applied across all graphemes. As the child grows older, fewer random letter naming errors are made in upper and lower case than were made in the preceeding years.

The third step in alphabet letter identification involves confusions between letters which occur within the same feature group. Masonheimer (1981) suggests that these types of errors are due to the fact that the child is learning the relevant within group features and is increasingly focusing attention on them. Four years of age appears to be the critical age in learning to use distinctive features for letter identification. Errors in identification due to within group feature confusion decline between four and five. Four year olds appear to get a good grasp of distinctive between group identification features and begin to differentiate using the finer within group features.

By five years of age, most English speaking preschool children have a good grasp of the upper case alphabet and the distinctive features which are used to

discriminate between letters. Upper case letters are identified with approximately 70% accuracy. While upper case letters appear to be fairly well learned by age five, lower case letters cause more problems. Masonheimer (1981) has suggested that the increased number of feature group errors within the lower case at age four and five may be due to "finer" feature differentiations that are required in lower case letters. Rotation, line length, and dot are suggested as three of the "finer" distinctive features found in lower case letter configurations which four and five year olds have difficulty in mastering.

While we have some information about how English speaking preschool children learn the alphabet and the cognitive and perceptual processes they go through, nothing is known about how learners of other languages gain this knowledge. This study attempts to answer the question of how Spanish speaking preschool children learn to identify letters of the alphabet, the types of errors made in identifying letters of the alphabet, and whether there is a developmental learning sequence in alphabet learning for Spanish speakers. Also of concern is the question of whether or not Spanish speakers and English speakers of comparable socioeconomic levels perform in a similar manner on an alphabet letter identification task.

Method

Subjects. Sixty-three children from a Spanish language preschool and 64 children from two English language preschools participated in this study. Spanish speaking children included 15 five year olds (average age 63.5 months), 32 four year olds (average age 52.6 months), and 15 three year olds (average age 40.6 months). Ten English speaking five year olds (average age 63.5 months), 33 Eng-

lish four year olds (average age 52.1 months), and 21 English speaking three year olds (average age 40.9 months) took part in the study. Spanish speaking and English preschools were matched, as closely as possible, for socio-economic levels. All preschools were located in one town in a largely agricultural area of southern California. In all three preschools, childrens' names and labels on articles within the classrooms were printed using both upper and lower case letters. Objects and possessions at the Spanish language schools were labeled in Spanish, while objects at the English language schools were labeled in English. Some incidental discussion and instruction of both upper and lower case letters had occurred at all schools; for example, reading of alphabet books, saying the names of the letters as the child's name was being written on papers, helping the child to find his/her name on his/her "cubby hole", pictures and/or possessions. However, none of the children had received systematic alphabet instruction at school.

Design. Data were initially subjected to an analysis of variance with two between and one within subject factors. The between subjects factors were language (Spanish and English) and age (three, four, and five year olds). The within subject factor was letter case (upper and lower). The dependent variable was number of correct responses.

Type of error response to the target letter was the dependent variable for a second 2 x 3 x 2 x 3 analysis of variance. The two between subject factors were language and age. The within subject factors were letter case and error type (word or numbernaming, random letter naming, and featural errors).

Materials. The materials consisted of a set of 52 plastic coated cards measuring 4 inches by 4 inches. Because the English alphabet was going to be

taught later in the year in the Spanish speaking preschool, the English alphabet of 26 letters was used with both Spanish and English speaking subjects. Each card had one letter printed on it in black ink. Full space letters (all capitals and lower case b, l, f, etc.) were two inches in height. Half space letters (a, c, z, etc.) measured one inch in height. Noble sans-serf manuscript print type, taught to first grade children in California when they begin to receive formal instruction on written letter production, was the print style used (Noble, 1957).

Procedure. Subjects were individually shown 52 cards, each with a single upper or lower case letter printed on it. Upon being shown each card, the child was asked, "What is the name of this? What do we call this?"

A Spanish American graduate student worked with the Spanish speaking children, while an Anglo American graduate student worked in the English speaking preschools. Examiners were trained together and had 100% agreement on recording responses. Examiners were known to the children in the preschools in which they worked. All interaction with Spanish speakers was in Spanish. Upper and lower case letters were presented in random order across subjects. All responses were recorded and notation made regarding the language in which the response occurred.

Correct responses for both upper and lower case letters were tabulated for each level in each language. Shrugs, no response at all, or "Don't know" responses were grouped together in a non-response category for each age level. Error responses fell into three categories: 1) number or object names, 2) random letter naming, and 3) letter names which were within the feature group of the target letter. Type two errors of random letter naming occurred when letter names which were given were not from the same feature group as the target letter.

Feature group distinctions for upper case letters were determined by use of Gibson's (1969) shared feature chart. Dunn-Rankin's (1968a, 1968b) and Bouma's (1971) lower case feature groups were consolidated to establish a shared feature chart for lower case letters. Errors were analyzed and tabulated for each of the four age levels and for both upper and lower case.

Results

Analysis of the data was based upon two types of information, number of correct responses and type of error. As indicated in Table 1, an examination of correct responses, a language (2 levels) by age (3 levels) by case (2 levels) analysis of variance revealed that English speaking children identified more letters correctly than did Spanish speakers, ($F=81.73$, df 1, 115, $p<.001$); children at each age level identified more letters than children of preceeding age levels, ($F=11.79$, df 1, 115, $p<.001$); and upper case letters were identified correctly more often than lower case letters, ($F=20.79$, df 1, 115, $p<.001$).

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Insert Table 1 About Here

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However, there were also interactions between language and age and language and case. English speaking children correctly identified more letters at each age level than did Spanish speaking children, ($F=9.75$, df 1, 115, $p<.001$). While English speaking children at each level identified significantly more letters than children of preceeding age levels, age level increases for Spanish speakers were not significant (Figure 1). English speakers identified significantly more, ($F=7.32$, df 1, 115, $p<.007$) upper case than lower case letters, but performance for Spanish speaking children did not differ between cases (Figure 1).

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Insert Figure 1 About Here

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In examining error types, a language (2 levels) by age (3 levels) by case (2 levels) by error type (3 levels) analysis of variance revealed that Spanish speakers performed differently than English speakers, ($F=16.21$, df 1, 115, $p<.001$). Upper case responses were significantly different from lower case responses, ($F=4.16$, df 1, 115, $p<.04$), and there were significant differences in the types of errors children made ($F=59.48$, df 2, 230, $p<.001$). In addition, Spanish speakers at each age level performed in a significantly different manner than English speakers at the same age level, ($F=4.57$, df 2, 115, $p<.01$). Upper and lower case responses (Figure 2) were signigicantly different for Spanish and English speakers, ($F=7.97$, df 1, 115, $p<.005$), and Spanish and English speakers made significantly different

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Insert Figure 2 About Here

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types of errors, ($F=40.53$, df 2, 230, $p<.001$).

As indicated in Table 2, types of errors differed substantially with language

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and age. While conceptual errors are dropping for English speakers, they remain nearly constant for Spanish speakers. With increasing age, the number of random letter naming errors made by Spanish speakers increases, while they decrease among English speakers. More featural errors are made by English speakers and

the number of errors increases with age. Few featural errors are made by Spanish speakers and their rate of increase with age is not significant.

Discussion

Results indicate that both the Spanish and English speaking children who took part in this study are learning to identify the upper case before the lower case. This is occurring despite the fact that they are dealing with both upper and lower case alphabets in school environments. Both groups of children make conceptual, random letter and featural errors; however, the error response pattern of Spanish speakers is very different from that made by English speakers.

While the number of conceptual errors made by English speakers drops and no word naming at all occurs by age five, the number of conceptual errors made by Spanish speakers remains high and stable between three and five years of age. When conceptual errors made by Spanish speakers are divided into word naming and number naming, a distinctive developmental pattern, not observed in English speakers, is visible (Table 3). As the amount of word naming increases with age,

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Insert Table 3 About Here

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the amount of number naming decreases. This occurs in both upper and lower case. Responses indicate that while children are increasingly able to distinguish between numbers and letters, confusions between the concepts of word naming and letter naming increase between three and five years of age. Spanish speakers' word naming errors at age five consisted of responding with children's names, applying the word 'number' to each grapheme, describing the grapheme, i.e., round (c), ball (o), one stick and round (h), ball with stick (b), three sticks (H),

etc., and object naming, i.e., tire, house, Indian, pirate, horse, etc.

English speakers' random letter naming decreases with age, but Spanish speakers' random letter naming errors increase. Analysis of Spanish speakers' random letter naming reveals responses in which letter names are mixed with both word and number naming, i.e., A.C., one, swing, circle, etc., and responses in which letter names are mixed with number only, i.e., 12, c, x, 13, 18, etc. No random letter names were mixed with words only. This is further confirmation of Masonheimer's (1981) finding that alphabet concept learning is a two step process involving, first, confusion of words, numbers and letters, and then confusion of numbers and letters. These concept confusions are followed by perceptual confusions in the use of distinctive features. The large number of five year old word responses involving descriptors of the letter, i.e., stick and ball (b), may be evidence of a step prior to distinctive feature use. At this stage, the child is focusing on distinctive feature shapes and using descriptors as names, but is not yet using them to aid in letter naming.

The number of featural errors made by English speakers increase significantly with age. While the number of featural errors made by Spanish speakers also increases with age, differences are not significant and occur so infrequently that they may reflect a basement effect.

Results of this study indicate that Spanish speaking five year olds are performing in much the same manner as English speaking three year olds. At an age when children are entering kindergarten, many of these Spanish speaking preschool children appear to be unaware that specific letter names go with specific graphemes and have not learned or are unable to use the distinctive features to help differentiate between letters.

Comparison of these two groups of preschool children reveals a significant

difference in performance in an alphabet identification task. If alphabet identification is a tool which can be used to examine the preschool child's understanding and knowledge in areas dealing with literacy, the Spanish speaking children who took part in this study appear to have basic weakness in cognitive and linguistic areas dealing with literacy in their primary language.

Smith's (1977) suggestion that forming a conceptual basis for literacy depends upon the home environment prior to entering school, makes information about the home and family environment very important. Because information from parents was not available, directors of the three preschools were asked to provide family information (Table 4). This information is an approximation based upon informa-

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Insert Table 4 About Here

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tion obtained from parent/school discussions and interactions. Examination of the material reveals that while parents of both Spanish and English preschool children are working, Spanish speaking parents are probably putting in longer hours. Due to their jobs, largely in agriculture, their children arrive at school before breakfast and do not return home until supper time. If, as McNamara (1976) has suggested, children develop most of their first language literacy skills through linguistic experiences in the home, these Spanish speaking preschool children may not have much of an opportunity for the type of language interaction needed to develop literacy in Spanish. While the parents of English speaking preschool children are also working, the children spend less time in school and more time with the parents when language interactions can occur. Lack of family communications may not be as crucial to English speakers as to Spanish speakers, for English speaking children are surrounded by their first language. They hear English on the street, on the

television they watch, in the movies they see, in the stores they shop in. By and large, Spanish speaking children do not have this total immersion in Spanish; at best, they are surrounded by some of each language. Further in depth research is needed to determine home environment variables which might effect acquisition of these basic cognitive and linguistic skills.

Because the Spanish speaking preschool child is spending up to twelve hours a day at preschool and the home may not be able to provide the linguistic opportunities needed to develop cognitive, academic and linguistic proficiencies necessary for literacy in the first language, the school environment becomes doubly important. Examination of the school environments (Table 5) reveals that the Spanish language preschool is equivalent to or better than the English speaking preschool

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Insert Table 5 About Here

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in most areas addressed. However, while the material budget was much less than in the Spanish preschool, English speaking preschools appear to have a wider variety of materials related to the development of cognitive and linguistic skills, i.e., language development materials, magnetic alphabet boards, etc. Materials of this type would be particularly important in developing basic literacy concepts for preschool children, i.e., differences between object naming, numbers and letters, areas which are still causing confusion for Spanish speaking five year olds.

Conclusion

Comparison of a group of Spanish and English speaking preschool children on an alphabet identification task reveals significant differences in the way children name alphabet letters. Error anlysis indicates that Spanish speaking children

at age five still have conceptual confusions between letter naming and word naming and are not yet able to use the distinctive features of letters to aid in grapheme identification. English speaking children, at age five, no longer exhibit confusions between word naming and letter names, and are able to use distinctive features to differentiate between letters. If children from both of these groups are placed in a kindergarten classroom together, the English speaking children would be performing at a level vastly different from the Spanish speakers. To ensure successful learning, curriculum objectives and materials would need to be adjusted to meet the conceptual needs of the Spanish speaking learner. Failure to recognize these differences and change curriculum and materials to meet them may be the basis for many childrens' failure to achieve basic necessary threshold levels of literacy in their primary language.

Due to lack of time with parents in the home environment, Spanish speaking children who took part in this experiment are particularly dependent upon the preschool for development of the cognitive and linguistic skills necessary for literacy in the primary language. The amount of money spent on preschool education does not appear to assure the learning of these basic concepts. Preschool environments rich in language, language development activities, and experiences with print are of primary importance for these Spanish speaking preschool children. In addition, teacher awareness of each child's conceptual level and ability to adjust materials to meet those levels are imperative.

Information gained from a simple alphabet identification task such as this can be used as a tool for assessing cognitive and linguistic knowledge related to literacy of very young Spanish speaking learners. This information can be of further value in formulating objectives and choosing materials for preschool and kindergarten classrooms to meet and develop the instructional needs of each individual learner.

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Table 1: Response Types, Spanish and English Speakers, Upper and Lower Case Alphabet

		Spanish Speakers						English Speakers					
Case	Age	Don't Know Responses		Error Responses		Correct Responses		Don't Know Responses		Error Responses		Correct Responses	
		m	sd	m	sd	m	sd	m	sd	m	sd	m	sd
UPPER	3	8.8	8.9	16.9	8.7	.36	.63	5.9	8.8	15.1	10.3	4.4	7.4
	4	6.9	7.1	18.5	6.8	.7	1.4	5.2	7.7	9.2	7.6	11.6	9.0
	5	5.2	5.9	19.2	7.2	1.1	2.2	1.3	1.9	6.2	4.3	18.5	5.4
LOWER	3	9.8	8.7	16.9	8.7	.0	.0	5	8.5	17.9	9.9	2.9	6.0
	4	8.3	8.1	17.5	8.1	.18	.47	5.6	7.7	11.0	7.7	9.3	7.4
	5	5.5	6.9	19.3	7.0	.6	1.5	1.3	2.9	7.83	3.7	16.8	3.8

Table 2: Identification Responses, Spanish and English Speakers, Upper and Lower Case Alphabets

		Spanish Speakers						English Speakers					
Case	Age	Conceptual Errors		Random Letter Naming Errors		Featural Errors		Conceptual Errors		Random Letter Naming Errors		Featural Errors	
		m	sd	m	sd	m	sd	m	sd	m	sd	m	sd
UPPER	3	16.1	9.1	.35	1.3	.35	1.3	7.6	9.7	5.9	7.7	1.6	2.6
	4	16.2	7.6	1.65	3.3	.62	1.4	2.5	5.7	3.9	4.2	2.2	2.3
	5	15.8	10.2	2.8	5.9	.6	1.4	1.3	2.1	2.5	2.6	2.3	1.4
LOWER	3	15.2	8.8	.57	1.9	.21	.8	11.1	11.8	5.8	9.3	1.2	1.9
	4	16.2	8.3	1.0	2.2	.28	.58	3.5	6.0	4.4	4.9	3.2	2.5
	5	16.0	10.1	3.0	5.9	.86	1.8	1.7	2.4	1.0	1.5	5.2	2.6

Table 3: Spanish Speakers Conceptual Error Responses

Case	Age	Word Naming Errors m	Word Naming Errors sd	Number Naming Errors m	Number Naming Errors sd
UPPER	3	1.9	2.2	13.6	9.6
	4	4.0	5.4	13.2	12.5
	5	5.1	8.2	10.7	12.2
LOWER	3	2.2	3.1	13.0	8.8
	4	3.9	6.9	12.6	10.
	5	6.5	9.6	9.5	11.8

Table 4: Family Information

	Families of Spanish Speaking Children	Families of English Speaking Children
Yearly Average Income	$10,000	$12,000 **
Hours Worked Per Day	12 - Daylight to Dark	7 **
% of Both Parents Working (2 Parent Families)	100%	100%
Parental Age	Middle 20's	25-30
Family Structure	2 Parent Families No Single Parents	35% Single Parent ** Families
# of Children in Family	1-8 Children Average: 3	1-6 Children ** Average: 1.75
Parental Education	95% Literate in Spanish Few English Speakers	All Literate in English Some Literate in 2 Languages

** Average of both English speaking preschools.

Table 5: Preschool Information

	Spanish School	English School
Budget	$290,000 per year	$52, 500 per year *
Funding Source	U.S. Department of Agriculture U.S. Department of Education California Department of Ed.	Self Supporting
Spending Restrictions	None - budget developed on site	None - budget developed on site
Materials Budget	$20,00 per year	#1,950 per year *
Teachers' Salaries	80% of budget	75% of budget *
Teacher/Aide Training	1 B.A. 0 B.S. 4 A.A. 1 Teaching Credential 4 Currently Enrolled in Training Program	1 B.A. 1 B.S. 3 A.A. 0 Teaching Credential 3 Currently Enrolled in Training Program
Teachers' Language	4 Spanish Only 1 English Only 5 Spanish/English	8 English Only 0 Other Languages
Average Daily Enrollment	83	47 *
Adult/Pupil Ratio	1 to 8	1 to 8
Pupil Turnover	Approximately 7% Per Year	Approximately 47% * Per Year

Table 5: Cont.

	Spanish School	English School
Daily Hours	6 a.m. - 6 p.m. Including breakfast, lunch	7 a.m. - 6 p.m. Bring lunch from home. Children may attend full or half day. **
Days Per Week	All children attended 5 days a week	Children may attend 2, 3, or 5 days per week
Materials Found in Classroom	Blocks, puzzles, games, dolls, playhouse, trucks, records, music, books: English & Spanish, lotto games	Blocks, puzzles, games, dolls, playhouse, trucks, records, music, books: English. lotto games, magnet letter boards, language development materials, Christian curriculum materials
Daily Reading	Yes	Yes
Trips to Library	Yes	No

* Averaged over 2 English speaking preschools

** Found in one school only

Figure Captions

Figure 1. Letter identification by language, age, and case.

Figure 2. Letter identification by language and case.

Figure 3. Error response types by language and age.

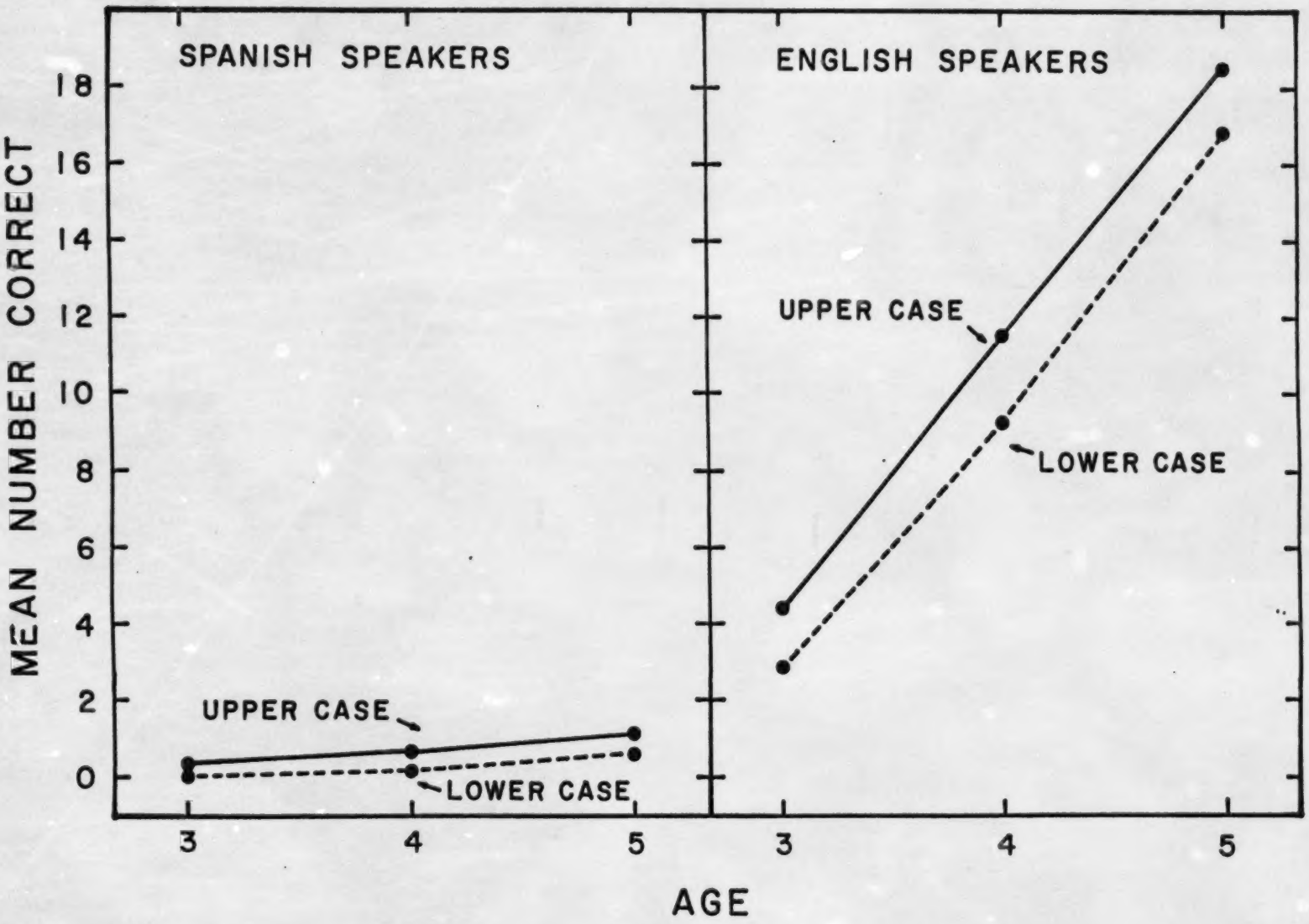
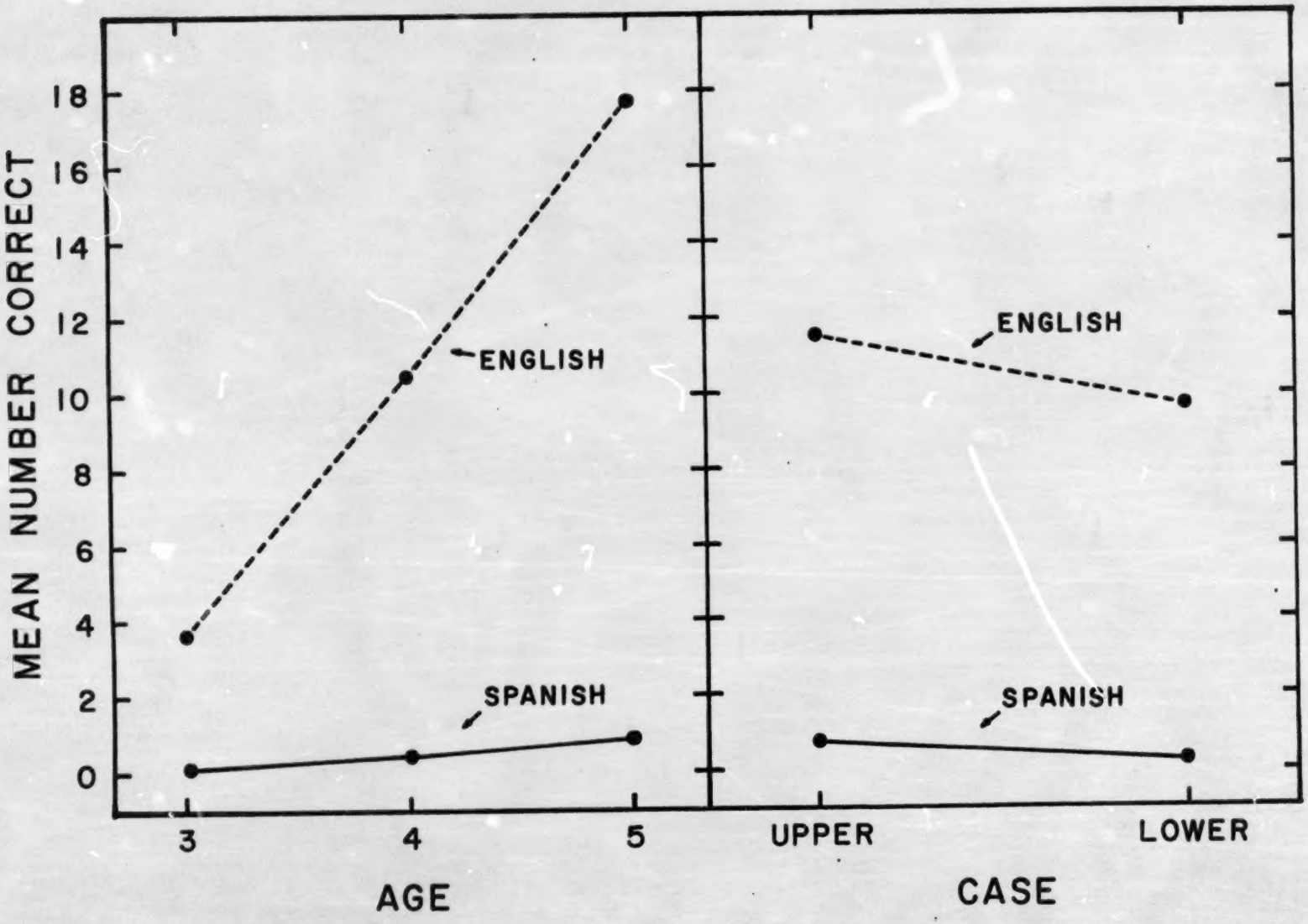


Figure 1

Masonheimer


MEAN NUMBER CORRECT
18
16
14
12
10
8
6
4
2
0
ENGLISH
SPANISH
3
4
5
AGE
ENGLISH
SPANISH
UPPER
LOWER
CASE

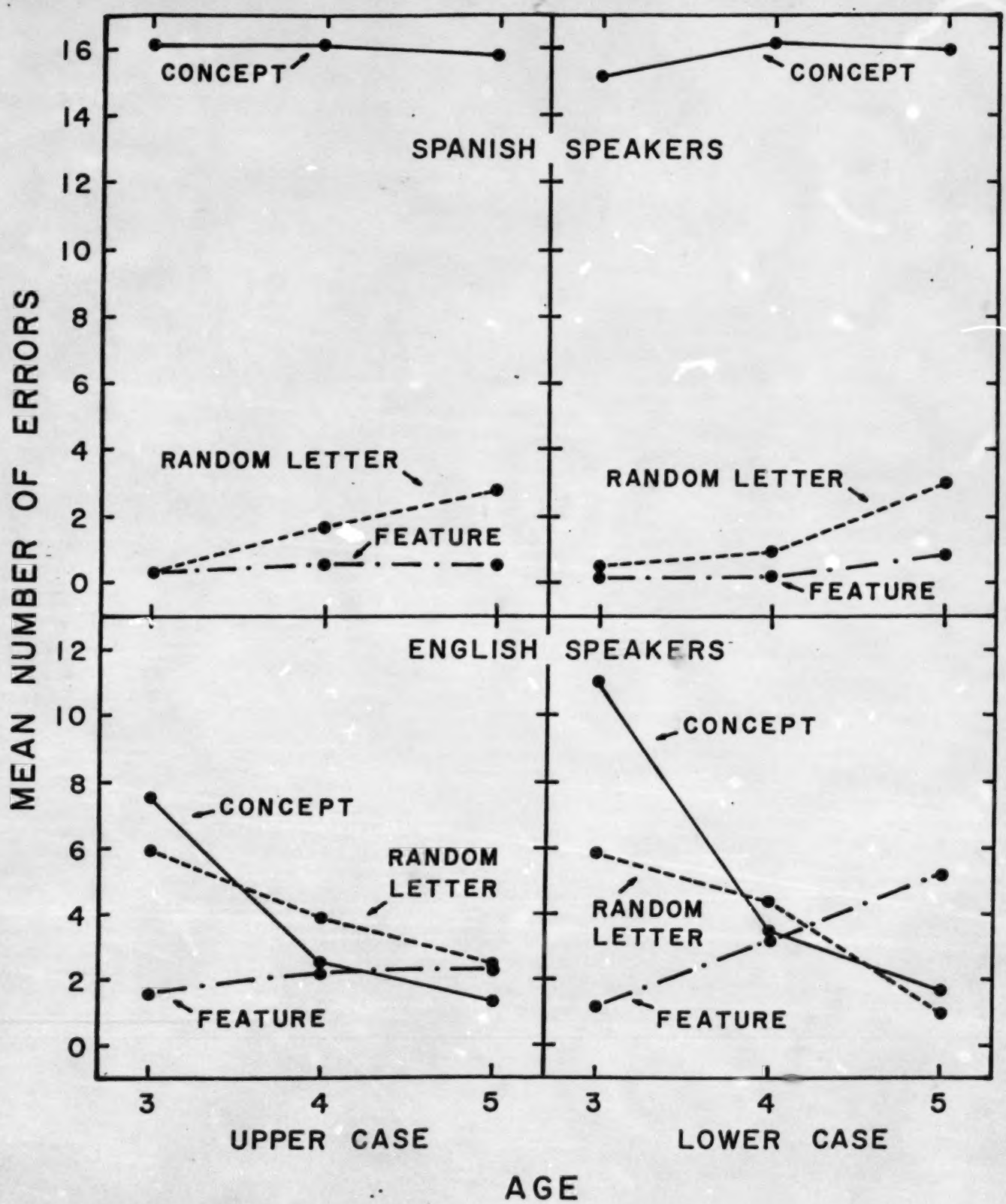

MEAN NUMBER OF ERRORS
16
14
12
10
8
6
4
2
0
CONCEPT
SPANISH SPEAKERS
RANDOM LETTER
FEATURE
CONCEPT
RANDOM LETTER
FEATURE
ENGLISH SPEAKERS
12
10
8
6
4
2
0
CONCEPT
RANDOM LETTER
FEATURE
CONCEPT
RANDOM LETTER
FEATURE
3
4
5
UPPER CASE
3
4
5
LOWER CASE
AGE

Figure 3